



**[4910-13]**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 25**

**[Docket No. FAA-2013-0900; Notice No. 25-12-08-SC]**

**Special Conditions:** Airbus, Model A350-900 Series Airplane; General Limiting Requirements.

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed special conditions.

**SUMMARY:** This action proposes special conditions for the Airbus Model A350-900 series airplanes. This airplane will have a novel or unusual design feature associated with general limiting requirements of its flight envelope protection features. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

**DATES:** Send your comments on or before **[insert date 45 days after date of publication in the Federal Register]**.

**ADDRESSES:** Send comments identified by docket number FAA-2013-0900 using any of the following methods:

- Federal eRegulations Portal: Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.
- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation

(DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.

- Hand Delivery or Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov/>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except federal holidays.

**FOR FURTHER INFORMATION CONTACT:** Joe Jacobsen, FAA, Airplane and Flightcrew Interface, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone (425) 227-2011; facsimile (425) 227-1320.

## **SUPPLEMENTARY INFORMATION:**

### **Comments Invited**

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

We will consider all comments we receive on or before the closing date for comments. We may change these special conditions based on the comments we receive.

### **Background**

On August 25, 2008, Airbus applied for a type certificate for their new Model A350-900 series airplane. Later, Airbus requested and the FAA approved an extension to the application for FAA type certification to June 28, 2009. The Model A350-900 series has a conventional layout with twin wing-mounted Rolls-Royce Trent engines. It features a twin aisle 9-abreast economy class layout, and accommodates side-by-side placement of LD-3 containers in the cargo compartment. The basic Model A350-900 series configuration will accommodate 315 passengers in a standard two-class arrangement. The design cruise speed is Mach 0.85 with a Maximum Take-Off Weight of 602,000 lbs. Airbus proposes the Model A350-900 series to be certified for extended operations (ETOPS) beyond 180 minutes at entry into service for up to a 420-minute maximum diversion time.

Flight envelope protection is the subject of several proposed special conditions for the A350. Each specific type of envelope protection is addressed individually, but some requirements are common to all limiting systems and are therefore put forth as general limiting requirements.

## **Type Certification Basis**

Under Title 14, Code of Federal Regulations (14 CFR) 21.17, Airbus must show that the Model A350-900 series meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25-1 through 25-129.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model A350-900 series because of a novel or unusual design feature, special conditions are prescribed under § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, the proposed special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and proposed special conditions, the Model A350-900 series must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36 and the FAA must issue a finding of regulatory adequacy under section 611 of Public Law 92-574, the "Noise Control Act of 1972."

The FAA issues special conditions, as defined in 14 CFR 11.19, under § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

## **Novel or Unusual Design Features**

The Airbus Model A350-900 series will incorporate the following novel or unusual design features: General Limiting Requirements for the flight envelope protection system.

## **Discussion**

This proposed special condition and the following ones which pertain to flight envelope

protection present general limiting requirements for all the unique flight envelope protection features of the basic A350 Electronic Flight Control System (EFCS) design. Current regulations do not address these types of protection features. The general limiting requirements are necessary to ensure a smooth transition from normal flight to the protection mode and adequate maneuver capability. The general limiting requirements also ensure that the structural limits of the airplane are not exceeded. Furthermore, failure of the protection feature must not create hazardous flight conditions. Envelope protection parameters include angle of attack, normal load factor, bank angle, pitch angle, and speed. To accomplish these envelope protections, one or more significant changes occur in the EFCS control laws as the normal flight envelope limit is approached or exceeded.

### **Applicability**

As discussed above, these proposed special conditions apply to Airbus Model A350-900 series airplanes. Should Airbus apply later for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the proposed special conditions would apply to that model as well.

### **Conclusion**

This action affects only certain novel or unusual design features on the Airbus Model A350-900 series airplanes. It is not a rule of general applicability.

### **List of Subjects in 14 CFR Part 25**

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

## **The Proposed Special Conditions**

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for Airbus Model A350-900 series airplanes.

### **1. General Limiting Requirements.**

a. Onset characteristics of each envelope protection feature must be smooth, appropriate to the phase of flight and type of maneuver, and not in conflict with the ability of the pilot to satisfactorily change airplane flight path, speed, or attitude as needed.

b. Limit values of protected flight parameters (and if applicable, associated warning thresholds) must be compatible with the following:

(1) Airplane structural limits,

(2) Required safe and controllable maneuvering of the airplane, and

(3) Margins to critical conditions. Unsafe flight characteristics/conditions must not result if dynamic maneuvering, airframe and system tolerances (both manufacturing and in-service), and non-steady atmospheric conditions, in any appropriate combination and phase of flight, can produce a limited flight parameter beyond the nominal design limit value.

c. The airplane must be responsive to intentional dynamic maneuvering to within a suitable range of the parameter limit. Dynamic characteristics such as damping and overshoot must also be appropriate for the flight maneuver and limit parameter in question.

d. When simultaneous envelope limiting is engaged, adverse coupling or adverse priority must not result.

### **2. Failure States**

EFCS failures (including sensor) must not result in a condition where a parameter is limited to

such a reduced value that safe and controllable maneuvering is no longer available. The crew must be alerted by suitable means if any change in envelope limiting or maneuverability is produced by single or multiple failures of the EFCS not shown to be extremely improbable.

Issued in Renton, Washington, on October 22, 2013

Stephen P. Boyd  
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Aircraft Certification Service

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